
January 2006

DEFENSE ACQUISITIONS

DOD Management Approach and Processes Not Well- Suited to Support Development of Global Information Grid



Report Documentation Page			Form Approved OMB No. 0704-0188		
<p>Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p>					
1. REPORT DATE JAN 2006	2. REPORT TYPE	3. DATES COVERED 00-01-2006 to 00-01-2006			
4. TITLE AND SUBTITLE Defense Acquisitions. DOD Management Approach and Processes Not Well-Suited to Support Development of Global Information Grid			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Government Accountability Office, 441 G Street NW, Washington, DC, 20548			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT see report					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF: a. REPORT b. ABSTRACT c. THIS PAGE unclassified unclassified unclassified			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 40	19a. NAME OF RESPONSIBLE PERSON



Highlights of GAO-06-211, a report to congressional committees

January 2006

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Why GAO Did This Study

Department of Defense (DOD) officials currently estimate that the department will spend approximately \$34 billion through 2011 to develop the core network of the Global Information Grid (GIG), a large and complex undertaking intended to provide on-demand and real-time data and information to the warfighter. DOD views the GIG as the cornerstone of information superiority, a key enabler of network-centric warfare, and a pillar of defense transformation.

A high degree of coordination and cooperation is needed to make the GIG a reality. In prior work GAO found that enforcing investment decisions across the military services and assuring management attention and oversight of the GIG effort were key management challenges facing DOD. This report assesses (1) the management approach that DOD is using to develop the GIG and (2) whether DOD's three major decision-making processes support the development of a crosscutting, departmentwide investment, such as the GIG.

What GAO Recommends

GAO is recommending DOD adopt a management approach with more clearly defined leadership, authority to enforce investment decisions across organizational lines, and accountability for ensuring the objectives of the GIG are achieved. DOD concurred with GAO's recommendation.

www.gao.gov/cgi-bin/getrpt?GAO-06-211.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Michael J. Sullivan at (202) 512-4841 or SullivanM@GAO.GOV.

What GAO Found

DOD's management approach for the GIG—in which no one entity is clearly in charge or accountable for results—is not optimized to enforce investment decisions across the department. The DOD Chief Information Officer has lead responsibility for the GIG development effort, but this office has less influence on investment and program decisions than the military services and defense agencies, which determine investment priorities and manage program development efforts. Consequently, the services and defense agencies have relative freedom to invest or not invest in the types of joint, net-centric systems that are consistent with GIG objectives. Without a management approach optimized to enforce departmentwide investment decisions, DOD is at risk of not knowing whether the GIG is being developed within cost and schedule, whether risks are being adequately mitigated, or whether the GIG will provide a worthwhile return on DOD's investment.

The department's three major decision-making processes are not structured to support crosscutting, departmentwide development efforts such as the GIG. In some significant respects, the department's processes for setting requirements, allocating resources, and managing acquisitions encourage investing in systems on an individual service and defense agency basis. While the department has developed a new process for determining requirements, the framework to assess capability needs is still evolving; the new process is not yet identifying shortfalls and gaps in joint military capabilities on a departmentwide basis; and requirements-setting continues to be driven by service perspectives. In addition, the resource allocation process is structured in terms of individual service programs and outdated mission areas instead of crosscutting capabilities such as net-centricity, and it is not flexible enough to quickly accommodate requirements resulting from lessons learned or from rapidly emerging technologies. Also, the process for managing acquisitions is unsuited to developing a system of interdependent systems such as the GIG, and DOD has struggled to achieve service buy-in on joint-service development programs to address interoperability problems. Finally, the lack of integration among these three processes makes it difficult to ensure that development efforts are affordable and technically feasible.

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Abbreviations

C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CIO	Chief Information Officer
DOD	Department of Defense
FYDP	Five Year Defense Plan; Future Years Defense Program
GIG	Global Information Grid
GIG-BE	Global Information Grid-Bandwidth Expansion
IT	Information Technology
JBMC2	Joint Battle Management Command and Control
JCIDS	Joint Capabilities Integration and Development System
JFC	Joint Functional Concepts
JOC	Joint Operating Concepts
JROC	Joint Requirements Oversight Council
JTRS	Joint Tactical Radio System
NCES	Network Centric Enterprise Services
OMB	Office of Management and Budget
PPBE	Planning, Programming, Budgeting, and Execution process
PPBS	Planning, Programming, and Budgeting System
SINCGARS	Single Channel Ground and Airborne Radio System
TSAT	Transformational Satellite Communications System
WIN-T	Warfighter Information Network-Tactical

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**United States Government Accountability Office
Washington, DC 20548**

January 30, 2006

The Honorable John Warner
Chairman
The Honorable Carl Levin
Ranking Minority Member
Committee on Armed Services
United States Senate

The Honorable Duncan L. Hunter
Chairman
The Honorable Ike Skelton
Ranking Minority Member
Committee on Armed Services
House of Representatives

Despite recent progress by the Department of Defense (DOD), military operations continue to be hampered by command, control, and communications systems that lack the ability to interoperate.¹ While DOD has been able to patch together disparate systems and networks to facilitate communications on the battlefield, retrofitting systems after they have already been fielded can be inefficient and is not sufficient to meet DOD's stated goal of achieving a networked force where soldiers, weapon systems, platforms, and sensors are closely linked and able to operate seamlessly together. DOD believes it can solve these interoperability problems and achieve a networked force by developing the Global Information Grid (GIG). The GIG is a large and complex set of programs and initiatives intended to provide an Internet-like capability allowing users at virtually any location to access data on demand, share information in real time, collaborate in decision making regardless of which military service produced which weapon system, and have greater joint command of a battle situation.

DOD began investing in the GIG in the late 1990s. We reported in 2004 that DOD planned to spend at least \$21 billion through 2010 to develop a core

¹ GAO, *Military Operations: Recent Campaigns Benefited from Improved Communications and Technology, but Barriers to Continued Progress Remain, GAO-04-547* (Washington, D.C.: June 2004).

network for the GIG.² Today, DOD officials estimate that the GIG infrastructure will cost approximately \$34 billion through 2011.³ DOD's investment in the GIG will extend far beyond development of the core network, as DOD also intends to integrate the majority of its existing and planned weapon systems, information technology systems, and other related systems into the GIG over the long term. Accomplishing these objectives involves developing and advancing new technologies, reaching consensus on common standards and requirements, aligning systems with the attributes of the GIG, and assessing whether the GIG is providing a worthwhile return on investment.

In prior work, we identified management and investment challenges, operational challenges, and technical challenges DOD faces in implementing the GIG.⁴ We found that enforcing investment decisions across the military services and assuring management attention and oversight were key challenges facing DOD. In this report, conducted under the authority of the Comptroller General, we further examine management challenges by (1) assessing the management approach that DOD is using to develop the GIG and (2) addressing whether DOD's three major decision-making processes support the development of a crosscutting, departmentwide investment, such as the GIG. These major decision-making processes are the Joint Capabilities Integration and Development System, which DOD uses to identify, assess, and prioritize military capability needs; the Planning, Programming, Budgeting, and Execution process, which guides how DOD allocates resources; and the Defense Acquisition System, which governs how DOD acquires weapon and information technology systems. We are addressing this report to you because we believe it will be of interest to your committees as you consider DOD's requests to authorize and appropriate funds for developing the GIG.

To assess DOD's management approach for the GIG and the extent to which the department's primary decision-making processes support the GIG, we collected and reviewed (1) related legislation, directives,

² GAO, *Defense Acquisitions: The Global Information Grid and Challenges Facing Its Implementation*, [GAO-04-858](#) (Washington, D.C.: July 2004).

³ DOD officials confirmed that most of the difference between the estimate reported by GAO in 2004 and the \$34 billion figure reported here can be attributed to greater spending for information assurance activities.

⁴ [GAO-04-858](#).

instructions, and guidance; (2) DOD policies and guidance related to the GIG and network-centric (or “net-centric”) governance; and (3) programmatic and technical documents pertaining to core GIG systems. We also conducted a review of relevant literature, analyzing studies on net-centric warfare, systems interoperability, and DOD management and investment decision making. These studies were collected from defense and public policy research databases as well as the online collections of DOD organizations (such as the Defense Science Board and the Joint C4ISR Decision Support Center), individual think tanks, and congressional agencies. We also drew upon previous GAO reports on defense acquisition, information technology investments, and interoperability issues. We conducted interviews with and received briefings from officials with a number of DOD organizations (including the Office of the Secretary of Defense; the Joint Staff; and the three military services—the Departments of the Air Force, the Army, and the Navy) that have responsibility for achieving the GIG. We also interviewed several subject matter experts from academic, think tank, or consulting organizations who have senior-level DOD experience or who have recently written on the operation of DOD and its key decision-making processes. Additional information on our scope and methodology is in appendix I. We conducted our work from December 2004 through January 2006 in accordance with generally accepted government auditing standards.

Results in Brief

DOD’s decentralized management approach for the GIG is not optimized for the development of this type of joint effort, which depends on a high degree of coordination and cooperation. Clear leadership and the authority to enforce investment decisions across organizational lines are needed to achieve the level of coordination and cooperation required, but no one entity is clearly in charge of the GIG or equipped with the requisite authority, and no one entity is accountable for results. For example, DOD assigned overall leadership responsibility for the GIG to the DOD Chief Information Officer, to include responsibility for developing, maintaining, and enforcing compliance with the GIG architecture; advising DOD leadership on GIG requirements; and providing enterprisewide oversight of the development, integration, and implementation of the GIG. However, the Chief Information Officer generally has less influence on investment and program decisions than the military services and defense agencies, which determine investment priorities and manage program development efforts. Consequently, the services and defense agencies have relative freedom to align or not align their investments with GIG objectives. A result of this shared responsibility for the GIG is that the various offices and programs managing development of initiatives related to the GIG lack

a clear understanding of what the GIG concept is and neglect to coordinate with each other. Without a management approach optimized to enforce investment decisions across the department, DOD is at risk of not knowing whether the GIG is being developed within cost, schedule, and performance objectives. In prior work, GAO has stated that a decentralized management structure and the absence of an effective central enforcement authority are leading causes for the interoperability problems experienced in past military operations. We have also reported that an essential ingredient for better ensuring that overall DOD business transformation is implemented and sustained is to create a Chief Management Officer position to address key stewardship responsibilities in areas such as information technology.

In addition, DOD's major decision-making processes are not structured to support crosscutting, departmentwide efforts such as the GIG. Overall, these processes were established to support service- and platform-oriented programs rather than joint, net-centric programs, and in some significant respects, they remain configured in this way. The Joint Capabilities Integration and Development System (JCIDS) was implemented in 2003 to enhance the department's ability to determine requirements for joint military capabilities, but its analytical framework is still evolving, and it is not yet providing assessments of capability needs on a departmentwide basis. Consequently, JCIDS is of limited use for the time being in terms of developing a departmentwide investment strategy for the net-centric systems critical to the GIG. The Planning, Programming, Budgeting, and Execution process does not foster integration of the military services' and defense agencies' budgets to allow for a more cooperative, joint investment approach for the acquisition of joint capabilities. In addition, the resource allocation process, which has tended to favor longer-term weapon system development efforts, is not flexible enough to accommodate emerging requirements resulting from lessons learned in recent military operations or the rapidly advancing information technologies that are characteristic of command, control, and communications systems. DOD's acquisition process continues to move programs forward without sufficient knowledge that technologies can work as intended; consequently, weapon systems cost more and take longer to develop than originally planned and deliver less capability than initially promised. In addition, with increased emphasis on joint, net-centric capabilities, key transformational systems under development depend on capabilities being provided by other acquisition programs, and they depend on integrated architectures and common standards as a foundation for interoperability. However, the acquisition process is not well-suited to managing interdependencies among programs and fostering

joint-service cooperation in development of weapon and information systems. Finally, the lack of integration among these three processes makes it difficult to ensure that development efforts are affordable and technically feasible.

We are recommending DOD adopt a management approach with more clearly defined leadership, authority to enforce investment decisions across organizational lines, and accountability for ensuring the objectives of the GIG are achieved. In written comments on a draft of this report, DOD concurred with our findings and recommendation (DOD's letter is reprinted in app. II).

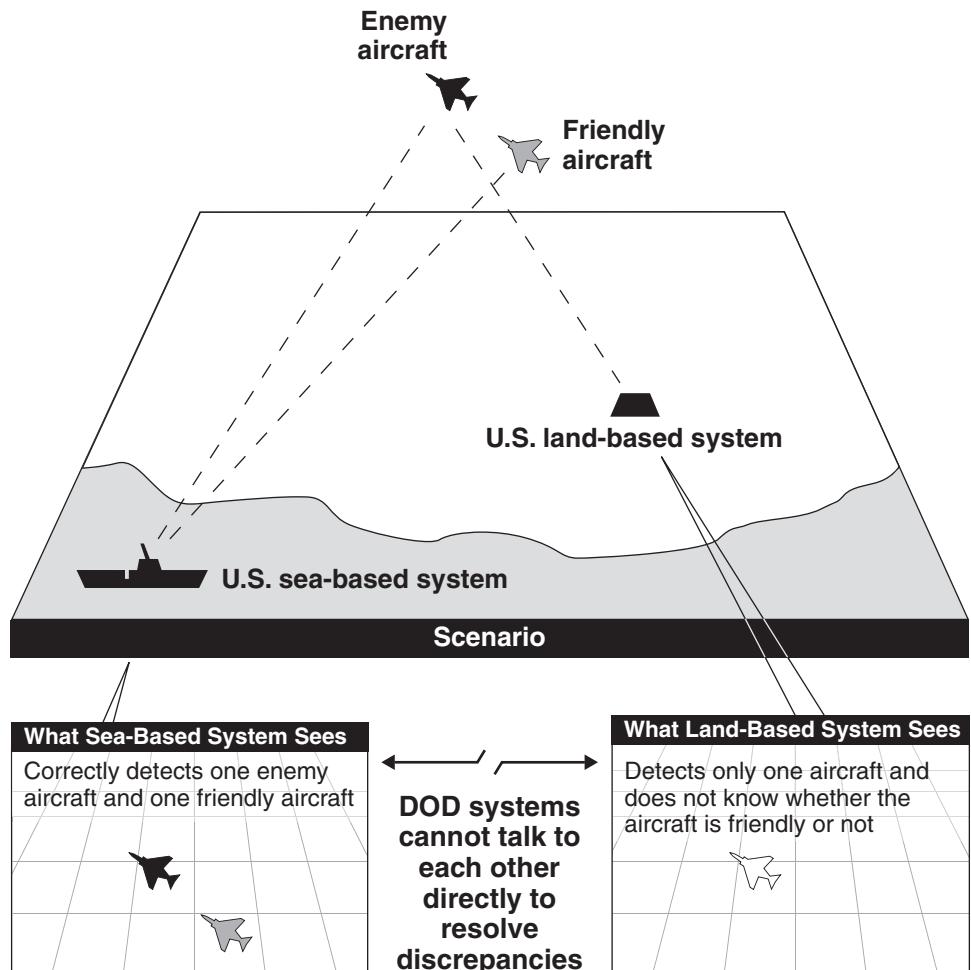
Background

DOD has increasingly emphasized joint military operations where, to the extent possible, service components are closely aligned and employed as a single joint force. To function effectively as a joint force, DOD has come to recognize the vital role of achieving information superiority over its adversaries by having better access to, and greater ability to share, information across the battlefield. In the late 1990s, the department began to articulate a vision for network-centric (or “net-centric”) warfare in which networking military forces improves information sharing and collaboration, which leads to enhanced situational awareness. Enhanced situational awareness enables more rapid, effective decisionmaking, which in turn enables improved efficiency and speed of execution and results in dramatically increased combat power and mission effectiveness.

A high degree of interoperability is required to achieve battlefield information superiority. DOD defines interoperability as the ability of systems, units, or forces to exchange data, information, materiel, and services to enable them to operate effectively together.⁵ A lack of interoperability can make it difficult to hit time-critical targets and distinguish “friend” from “foe.” Figure 1 shows a scenario in which a sea-based system and a land-based system are tracking aircraft and are unable to integrate their views of a battlefield. This lack of interoperability can delay U.S. military response or contribute to a lethal mistake involving U.S. personnel and equipment.

⁵ DOD Directive 4630.5, Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS) (May 5, 2004).

Figure 1: Scenario for Tracking Threats without Benefit of Interoperable Systems



Source: DOD (data); GAO (analysis and presentation).

DOD has recognized that interoperable systems are critical to conducting joint military operations and that patching systems after the fact to improve communications is inefficient, and the department has established policies to promote systems interoperability. However, GAO and DOD's Inspector General have reported in the past that these efforts have not been very effective. For example, in the first of a series of reports beginning in 2002, DOD's Inspector General found that policies governing systems interoperability were inconsistent and that without consistent

guidance the department was at risk of developing systems that lack the ability to fully interoperate.⁶ In 2003, we found that DOD's process for certifying systems interoperability did not work effectively for ground-surface-based intelligence processing systems.⁷ In addition, DOD officials have said that added emphasis on joint operations and reliance on information technology creates an increasing requirement for more systems to exchange information, which in turn makes achieving interoperability among systems increasingly complex.

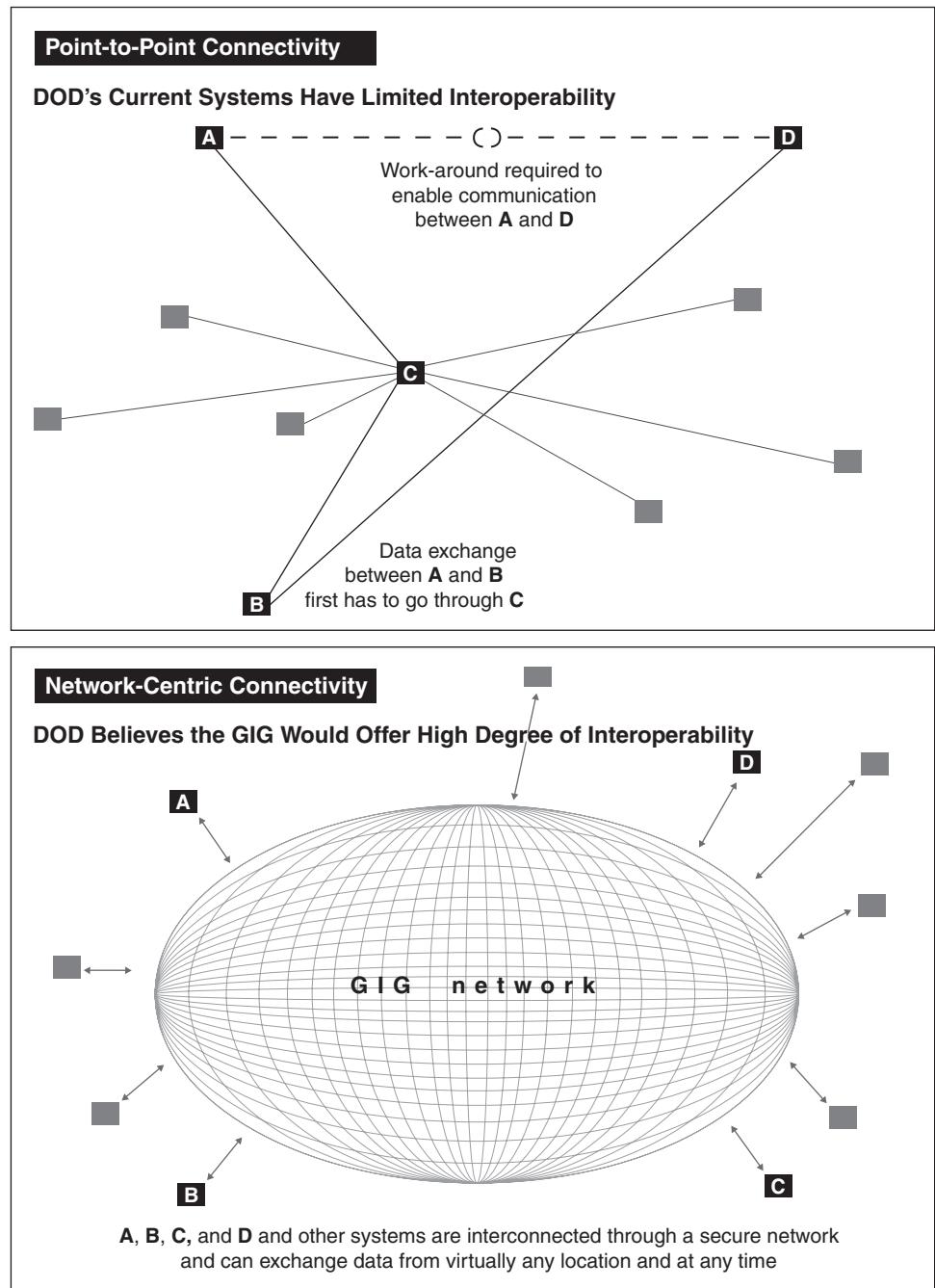
DOD views the GIG as the cornerstone of information superiority, a key enabler of net-centric warfare, and a pillar of defense transformation. DOD defines the GIG as the globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information.⁸ The GIG's many systems are expected to make up a secure, reliable network to enable users to access and share information at virtually any location and at anytime. Communications satellites, next-generation radios, and a military installations-based network with significantly expanded bandwidth will pave the way for a new paradigm in which DOD expects to achieve information superiority over adversaries, much the same way as the Internet has transformed industry and society on a global scale. Rather than striving for interoperability through efforts to establish direct information exchanges between individual systems, the focus of the new paradigm will be to ensure that all systems can connect to the network based on common standards and protocols. Figure 2 shows a general depiction of how DOD enables data exchanges in systems that lack the necessary connections and how DOD expects the GIG to break through such limitations.

⁶ DOD Inspector General, *Implementation of Interoperability and Information Assurance Policies for Acquisition of DoD Weapon Systems*, D-2003-011 (October 2002).

⁷ GAO, *Defense Acquisitions: Steps Needed to Ensure Interoperability of Systems That Process Intelligence Data*, GAO-03-329 (Washington, D.C.: March 2003).

⁸ DOD Directive 8100.1, Global Information Grid (GIG) Overarching Policy, Enclosure 2, E2.1.1.1 (Sept. 19, 2002).

Figure 2: Comparison of Communications Exchanges with and without the GIG



Source: DOD (data); GAO (analysis and presentation).

DOD has adopted a two-pronged approach to realizing the GIG: (1) invest in a set of new systems and capabilities to build a core infrastructure for the eventual GIG network (an overview of the five major acquisitions related to the GIG's core network are listed in app. III) and (2) populate the network with weapon and information systems that are able to connect when the core network infrastructure becomes available.

DOD's Management Approach for the GIG Is Not Optimized to Make Departmentwide Investment Decisions

The effort to make the GIG a reality represents a different, inherently joint type of development challenge that requires a high degree of coordination and cooperation, but DOD is using a management approach that is not optimized for this type of challenge. Responsibility for developing and implementing the GIG resides with numerous entities, with no one entity clearly in charge or accountable for investment decisions. Because the GIG will comprise a system of interdependent systems, it needs clearly identified leadership that has the authority to enforce decisions that cut across organizational lines. Without a management approach optimized to enforce investment decisions across the department, DOD is at risk of continuing to develop and acquire systems in a stovepiped and uncoordinated manner and of not knowing whether the GIG is being developed within cost and schedule, whether risks are being adequately mitigated, and whether the GIG will provide a worthwhile return on DOD's investment. Consequently, interoperability problems could continue to hamper DOD in fielding a joint, net-centric force.

Development of the GIG is essentially a shared responsibility in DOD, with no single entity both equipped with authority to make investment decisions and held accountable for results. For example, as laid out in policy directives, DOD's Chief Information Officer has overall responsibility for leadership and direction of the GIG. This includes developing, maintaining, and enforcing compliance with the GIG architecture; advising DOD leadership on GIG requirements; providing enterprise-wide oversight of the development, integration, and implementation of the GIG; monitoring and evaluating the performance of information technology and national security system programs; and advising the Secretary of Defense and the heads of DOD components on whether to continue, modify, or terminate such programs.⁹ However, the

⁹ DOD Directive 8100.1, Global Information Grid Overarching Policy (Sept. 19, 2002); DOD Directive 5144.1, Assistant Secretary of Defense for Networks and Information Integration/DOD Chief Information Officer (May 2, 2005).

Office of the Chief Information Officer generally has less influence on investment and program decisions than the services and defense agencies, which determine investment priorities and manage program development efforts. Consequently, the services and defense agencies have relative freedom to invest or not invest in the types of joint, net-centric systems that are consistent with GIG objectives. The end result of this shared responsibility is that neither the CIO nor the military services and defense agencies can be held fully accountable for the department's success or failure in developing the GIG.

More broadly, another result of this environment of shared responsibility is that the various offices and programs that are managing initiatives related to the GIG do so in a disparate manner. For example, a 2002 DOD study found that there was little unity of effort among the 80 separate initiatives and actions under way associated with joint command and control.¹⁰ The next year, DOD's Defense Science Board reported that joint warfighting needs—such as joint battle management and joint intelligence, surveillance, and reconnaissance—are “neglected or spread in an uncoordinated fashion across multiple service and defense agency programs.”¹¹ In 2004, the DOD Inspector General found that DOD lacked a strategy to integrate its net-centric initiatives, including clearly defined net-centric goals and organizational roles and responsibilities.¹² In responding to this study, DOD's Deputy Chief Information Officer (CIO) indicated that improvements could be made in the department's guidance and approach to achieving net-centric goals, but that elements of a strategic plan have been or are being developed. However, according to the study, management comments from other DOD entities “clearly illustrate that DoD components needed leadership and strategic guidance and were unaware that the...[CIO] had the lead for network-centric concepts.”¹³ The study also found that there was a lack of common

¹⁰ Joint Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (Joint C4ISR) Decision Support Center (DSC), *Joint Requirements Acquisition Study*, Closeout Report (July 15, 2002), 13.

¹¹ Defense Science Board. *Report of the Defense Science Board Task Force on Enabling Joint Force Capabilities*, (August 2003), 9.

¹² DOD Inspector General, *Joint Warfighting and Readiness: Management of Network Centric Warfare Within the Department of Defense*, D-2004-091 (June 22, 2004), 7.

¹³ D-2004-091, 13. The management entities are Office of Force Transformation, Joint Staff, Department of the Navy, U.S. Strategic Command, and the Defense Information Systems Agency.

understanding across DOD of what constitutes net-centric warfare—of which the GIG is a key enabler. Officials we interviewed in the Office of the Chief Information Officer stated that there is also a lack of common understanding throughout DOD about what is included in the GIG. DOD’s management approach to realizing joint, interoperable capabilities puts DOD at risk of duplicated efforts and suboptimal investment outcomes for command, control, and communications systems.

Almost 20 years ago, we identified DOD’s decentralized management structure and the absence of an effective central enforcement authority for joint interoperability as two causes for joint command, control, and communications interoperability problems experienced in past military operations. We concluded that solving the interoperability problem would require “a great deal” of cooperation among the services and a willingness among them to pursue interoperability even when it conflicts with their traditional practices.¹⁴ In 1993, we found DOD had not made significant progress in improving on this situation. We recommended that DOD establish a joint program office with directive authority and funding controls for acquiring command, control, and communications systems and that DOD consolidate responsibility for interoperability in U.S. Atlantic Command (now U.S. Joint Forces Command).¹⁵ DOD responded that our recommendations would unnecessarily complicate DOD management, and DOD stated that planned and recently implemented policy, procedural, and organizational changes intended to address the problem needed time to take effect.

In recent years, however, DOD has recognized that its approach to developing and fielding command, control, and communications systems was somewhat disjointed. In an effort to improve the situation, DOD tasked Joint Forces Command in 2003 to lead the development of advanced, integrated joint battle management command and control (JBMC2) capabilities departmentwide. While Joint Forces Command was given responsibilities to lead this effort, it does not control the resources for materiel solutions, and the command may not have sufficient influence over the services’ resource decisions to ensure the assessment framework it has developed for improving JBMC2 capabilities will be executed

¹⁴ GAO, *Interoperability: DOD’s Efforts to Achieve Interoperability Among C3 Systems*, GAO/NSIAD-87-124 (Washington, D.C.: April 1987).

¹⁵ GAO, *Joint Military Operations: DOD’s Renewed Emphasis on Interoperability Is Important but Not Adequate*, GAO/NSIAD-94-47 (Washington, D.C.: October 1993).

effectively. The framework for specific mission areas within JBMC2 will begin to be implemented in 2006, but formal agreements involving resourcing and level of service participation in these assessments have not yet been worked out. In addition, in 2004, the Joint Staff initiated the Net-Centric Operating Environment project in part to improve coordination of the GIG core network systems currently under development. The Joint Staff has proposed options to establish a stronger joint management structure for these systems, such as placing them under a single acquisition authority, and this analysis is being considered as part of DOD's Quadrennial Defense Review effort. In the meantime, a study released in 2005 by the Center for Strategic and International Studies, a bipartisan think tank, reiterates the need for DOD to instill a greater joint focus in its management approach to achieving systems interoperability by transferring budget and acquisition authority for joint command, control, and communications from the services to a single joint entity.

In the broader context of defense transformation—of which the GIG is a key component—we have pressed DOD to adopt a more centralized management approach to integrate and improve its business processes, human capital, and military capabilities. In 2004, we reported that no one person or entity had overarching and ongoing leadership responsibilities or accountability for the department's transformation efforts,¹⁶ and we recommended that DOD establish clear leadership and a formal crosscutting transformation team with the responsibility for overseeing and integrating DOD's transformation strategy and the authority to perform these responsibilities. DOD disagreed with our recommendations, indicating that the Secretary of Defense provides the leadership needed and that a crosscutting transformation team would represent an unneeded and confusing bureaucratic layer. However, we pointed out that (1) the day-to-day demands placed on the Secretary of Defense make it difficult for him to personally maintain the oversight, focus, and momentum needed to sustain transformation efforts and (2) that without a crosscutting team, DOD has no routine vehicle for maintaining a continued focus on transformation goals and no mechanism for resolving implementation issues that may arise. Similarly, to address problems DOD

¹⁶ GAO, *Military Transformation: Clear Leadership, Accountability, and Management Tools Are Needed to Enhance DOD's Efforts to Transform Military Capabilities*, GAO-05-70 (Washington, D.C.: December 2004), 3-4.

has long faced in managing its business systems¹⁷ and to guide the department's business transformation efforts, we have proposed that DOD establish a more centralized management structure to control the allocation and execution of funds for DOD business systems.¹⁸ Specifically, due to the complexity and long-term nature of business transformation efforts, we reported that strong and sustained executive leadership is needed if DOD is to succeed. We believe one way to ensure strong, sustained leadership for DOD's business management reform efforts would be to create a full-time, senior executive position for a chief management official, who would serve as the Deputy Secretary of Defense for Management. This position would serve as a strategic integrator to elevate and institutionalize the attention essential for addressing key stewardship responsibilities, such as strategic planning, enterprise architecture development and implementation, information technology (IT), and financial management, while facilitating the overall business management transformation within DOD. DOD's position has been that the Deputy Secretary of Defense has the requisite position, authority, and purview to perform the functions of a Chief Management Officer. Although DOD has recently begun taking some positive steps to transform the department's business operations, including establishing the Business Transformation Agency in 2005, we continue to believe that a Chief Management Officer position may better ensure that overall business transformation is implemented and sustained.

¹⁷ These would include business systems related to acquisition and contract management, financial management, supply chain management, support infrastructure management, human capital management, and other key areas.

¹⁸ GAO, *DOD Business Transformation: Sustained Leadership Needed to Address Long-standing Financial and Business Management Problems*, GAO-05-723T (Washington, D.C.: June 2005), 4; GAO, *Defense Management: Foundational Steps Being Taken to Manage DOD Business Systems Modernization, but Much Remains to be Accomplished to Effect True Business Transformation*, GAO-06-234T (Washington, D.C.: November 2005), 28.

DOD's Key Decision-Making Processes Are Not Designed to Support Investments in Crosscutting Efforts Such as the GIG

DOD's major decision-making processes are not structured to support crosscutting, departmentwide efforts such as the GIG. In some significant respects, the processes remain configured for investing in weapon and information systems on an individual service and defense agency basis. In addition, the department's new process for determining requirements is still evolving, and it is not yet identifying shortfalls and gaps in joint military capabilities on a departmentwide basis. The resource allocation process remains structured in terms of individual service programs and outdated mission areas instead of crosscutting capabilities such as netcentricity, and it is inflexible in terms of accommodating emerging near-term requirements and rapidly advancing technologies. DOD's acquisition process continues to move programs forward without sufficient knowledge that their technologies can work as intended; consequently, systems cost more and take longer to develop than originally planned and deliver less capability than initially promised. In addition, the acquisition process is not well suited to managing interdependencies among programs and fostering joint-service cooperation in development of weapon and information systems. Finally, the lack of integration among the three processes makes it difficult to ensure that development efforts are affordable and technically feasible.

The three processes assessed in this report are the Joint Capabilities Integration and Development System (JCIDS); the Planning, Programming, Budgeting, and Execution (PPBE) process; and the Defense Acquisition System.

JCIDS Process Not Yet Providing Departmentwide Assessment of Military Requirements

Implemented in 2003,¹⁹ JCIDS is intended to enhance the process DOD uses to identify, assess, and prioritize joint military requirements, but service perspectives continue to drive requirements setting, a condition that has tended to impede the development of interoperable systems in the past.²⁰ JCIDS is not yet identifying shortfalls and gaps in existing and projected joint military capabilities on a departmentwide basis, and the analytical framework that underpins JCIDS (capability-based assessments) is still evolving. Without crosscutting, department-level assessments, DOD

¹⁹ Chairman of the Joint Chiefs of Staff Instruction, Joint Capabilities Integration and Development System, CJCSI 3170.01E (May 11, 2005). The original instruction was CJCSI 3170.01C (June 24, 2003).

²⁰ See GAO, *Challenges and Risks Associated with the Joint Tactical Radio System Program*, GAO-03-879R (Washington, D.C.: August 2003), 2 and 22; Joint C4ISR Decision Support Center (July 15, 2002), iii and 17.

is limited in its ability to develop a departmentwide investment strategy to support development of the net-centric systems critical to the GIG.

JCIDS replaced the approximately 30-year-old Requirements Generation System, which DOD states frequently resulted in systems that were service rather than joint-focused, programs that duplicated each other, and systems that were not interoperable. Under this process, requirements were often developed by the services as stand-alone solutions to counter specific threats and scenarios. In contrast, JCIDS is designed to identify the broad set of capabilities that may be required to address the security environment of the 21st century. In addition, requirements under the JCIDS' approach are intended to be developed from the "top-down," that is, starting with the national military strategy, whereas the former process was "bottom up," with requirements growing out of the individual services' unique strategic visions and lacking clear linkage to the national military strategy. The Joint Requirements Oversight Council (JROC) has overall responsibility for JCIDS and is supported by eight Functional Capabilities Boards,²¹ which lead the capabilities-based assessment process.

The requirements process remains service-focused to a significant extent. For example, the four members of the Joint Requirements Oversight Council are the services' Vice Chiefs of Staff and the Assistant Commandant of the Marine Corps,²² an arrangement some studies contend grants too much influence to the services in setting requirements. The services are force providers—they supply the forces and develop the systems for military operations—but combatant commanders conduct joint military operations and thus represent the demand side of the requirements process. Combatant commanders are not, however, members of the Joint Requirements Oversight Council, and analyses conducted both prior to and following the implementation of JCIDS recommend either replacing the current members with representatives from the combatant commands or enlarging the Council to include such

²¹The eight boards are Command and Control, Battlespace Awareness, Focused Logistics, Force Management, Force Protection, Force Application, Net-Centric, and Joint Training.

²²The Chairman of the Joint Chiefs of Staff is the JROC Chairman, though the functions of the JROC chairman are delegated to the Vice Chairman of the Joint Chiefs of Staff. The JROC Secretary is the Joint Staff Director for Force Structure, Resources, & Assessment (J-8).

representatives.²³ DOD has included representatives from the combatant commands on the Functional Capabilities Boards, along with representatives from nine other organizations²⁴ (under the former requirements process, only representatives from the military services and the Defense Intelligence Agency served in a similar capacity). DOD officials indicate, however, that combatant commander participation on the boards is in reality limited and of ongoing concern, and a July 2005 Joint Forces Command briefing indicates that, so far, the combatant commands' requirements do not drive the requirements process. In May 2005, DOD introduced a new mechanism for the combatant commands to identify capability gaps,²⁵ and a DOD official told us the combatant commands are embracing this opportunity. However, the official also indicated that much requirements setting continues to be driven by the services at this point and that it is unclear how the services will respond to this type of input from the combatant commands.

The JCIDS process is still evolving. A key enabler for capability assessments under JCIDS are joint concepts, which are visualizations of future operations that describe how a commander might employ capabilities to achieve desired effects and objectives. The majority of the joint concepts have completed an initial phase of development, but they continue to be evaluated and revised.²⁶ These concepts are intended to

²³ Center for Strategic and International Studies (CSIS), *Beyond Goldwater-Nichols: U.S. Government and Defense Reform for a New Strategic Era, Phase 2 Report* (July 2005). M. Thomas Davis, "The JROC: Doing What? Going Where?" *National Security Studies Quarterly* (Summer 1998); Joint Forces Command point paper on combatant command input to capability development (July 25, 2005). In recent testimony before Congress, Chief Executive Officer of CSIS and former Deputy Secretary of Defense John J. Hamre recommended giving representation on the Council to the combatant commanders: *Testimony before the Subcommittee on AirLand, Senate Armed Services Committee* (Washington, D.C.: November 2005), 4.

²⁴ Offices of the Under Secretary of Acquisition, Technology, & Logistics; Under Secretary of Intelligence; Under Secretary of Defense, Comptroller; Under Secretary of the Air Force (Space); and Assistant Secretary of Defense for Networks and Information Integration/DOD Chief Information Officer; Director, Program Analysis & Evaluation; Mission Requirements Board; the military services; and the Defense Intelligence Agency.

²⁵ The Joint Capabilities Document.

²⁶ The Joint Operating Concepts are currently being revised and are expected to be submitted for approval by June 2006; subsequently, Joint Functional Concepts will be revised over the following year. Most of the more detailed concepts—Joint Integrating Concepts—have also completed an initial phase of development and also continue to be tested, but it is not clear when or if they will be further refined. See appendix IV for a description of each joint concept.

describe future capability needs in sufficient detail to conduct a capabilities-based assessment, which is the methodology through which capability gaps and excesses are identified. A Joint Staff official states that capability-based assessment continues to be refined daily and has yet to produce a common framework or set of rules.²⁷ At present, it can take several years to conduct a capabilities-based assessment under JCIDS, which is too slow according to a Joint Staff official associated with the process. However, the biggest challenge posed by a change such as JCIDS may be a cultural one: Joint Staff officials stated that the services are struggling with JCIDS, and the officials observed that the new process requires the services to change their behavior and think in a joint way.

JCIDS is not yet functioning as envisioned to define gaps and redundancies in existing and future military capabilities across the department and to identify solutions to improve joint capabilities. At this point, requirements continue to be defined largely from the “bottom up”—by the services—although DOD uses the JCIDS framework to assess the services’ proposals and push a joint perspective. The importance of defining capability needs and solutions from a crosscutting, department-level perspective was highlighted in a prominent 2004 study chartered by the Secretary of Defense, which stated that “a service focus does not provide an accurate picture of joint needs, nor does it provide a consistent view of priorities and acceptable risks across DOD.”²⁸ The study observed that the analytical capability for determining requirements largely resides in the military services, and it recommended that analyses of both joint needs and solutions to meet those needs be conducted at the department-level (in collaboration with the combatant commands, Joint Staff, defense agencies, services, and Office of the Secretary of Defense).

²⁷ Under JCIDS, the capability-based methodology consists of four stages: a Functional Area Analysis, which is to produce a prioritized list of capabilities and tasks needed to achieve military objectives; a Functional Needs Analysis, which is to produce a list of capability gaps that require solutions and the relative priority of the gaps identified; a Functional Solution Analysis, which identifies potential approaches to providing the capability needed; and a Post Independent Analysis, which provides for an independent review of the Functional Solution Analysis results.

²⁸ Joint Defense Capabilities Study Team (DOD), *Joint Defense Capabilities Study: Improving DoD Strategic Planning, Resourcing and Execution to Satisfy Joint Capabilities. Final Report* (Jan. 2004), iii.

Resource Allocation Process Does Not Support Crosscutting Investments

The resource allocation process is not structured to facilitate investments in crosscutting capabilities such as the GIG. Unlike JCIDS, the resource allocation process is structured in terms of individual service and defense agency programs rather than in terms of joint capability areas, such as netcentricity. In this structure, the military services have come to dominate in the development of the DOD budget, designing their programs and budgets based more on individual, service-focused systems than on crosscutting capabilities with broad joint utility. In part, this situation reflects the persistence of a service-centric culture rooted in the services' interpretation of their Title 10 authority to organize, train, and equip military forces.²⁹ This resource allocation culture has contributed to DOD's interoperability problems and made it difficult to capitalize on rapid advancements in information technology that can improve joint operational effectiveness.

The predecessor to PPBE was the Planning, Programming, and Budgeting System (PPBS), established in the early 1960s to be DOD's central strategic planning, program development, and resource allocation decision-making process. DOD expected the system to align the department's investments in defense programs with overarching national security objectives and military strategy, integrating the previously unrelated programs and budgets of the military services into a coherent program and budget for DOD as a whole. One of the central products of this system was the multiyear Five Year Defense Plan (FYDP),³⁰ which the Secretary of Defense could use to assess each military service's contribution to DOD's overall capability in crosscutting mission areas, termed as Major Force Programs.³¹ By categorizing service programs into a structure of Major Force Programs, the FYDP was intended to give the Secretary of Defense visibility over the totality of DOD's capabilities, and

²⁹ Sections 3013, 5013, and 8013 of Title 10 grant authority to the Secretaries of the Army, the Navy, and the Air Force, respectively, to conduct all affairs of their Departments including recruiting, organizing, supplying, equipping, training, servicing, mobilizing, demobilizing, administering, maintaining, and military construction and maintenance.

³⁰ Initially conceived as a 5-year plan, the FYDP has subsequently been extended to 6 years and re-designated the Future Years Defense Program.

³¹ Original Major Force Programs were Strategic Forces; General Purpose Forces; Command, Control, Communications, and Space; Airlift and Sealift; Guard and Reserve Forces; Research and Development; Central Supply and Maintenance; Training, Medical, General Personnel Account; Administration and Associated Activities; and Support to Other Nations. An eleventh Major Force Program, Special Operations Forces, was established in response to congressional direction in 1987.

thus enable the Secretary to make trade-off decisions among service investments in support of overall DOD objectives. The PPBS process fell short of these expectations in several respects:

- The services and defense agencies tended to receive the Secretary's planning guidance after they had begun preparing their proposed programs and budgets, and the guidance has been criticized for not clearly articulating DOD funding priorities, reflecting resource constraints, containing performance measures, or providing enough detail to be useful. Together, these factors contributed to the services' latitude to define their own investment priorities independent of the Secretary's stated objectives.
- The Office of the Secretary of Defense reviews of the services' program and budget submissions occurred late in the process. As a result, opportunities to build joint priorities (such as interoperable systems) into the services' program and budget submissions were limited, and joint initiatives were often addressed late in the process when it was more difficult to make changes.
- PPBS was structured to allocate resources to meet longer-term, more predictable needs, which made it difficult to accommodate (1) near-term requirements such as those identified by combatant commanders based on lessons learned from recent or ongoing military operations and (2) rapidly advancing technologies. For example, commercially developed information technology tends to advance quickly, and it has been difficult to plan for advances in these technologies through the normal planning and budget process.³²
- PPBS was not well integrated with the requirements determination and acquisitions processes to ensure that development efforts were affordable and technically feasible. For example, more acquisition programs are started than DOD can afford, with the result that many programs must compete for funding.³³ This situation in turn creates incentives to produce overly optimistic cost and schedule estimates and to over promise capability.

³² Defense Science Board, *Enabling Joint Force Capabilities*, 7.

³³ GAO, *Best Practices: Better Support of Weapon System Program Managers Needed to Improve Outcomes*, GAO-06-110 (Washington, D.C.: November 2005), 5.

- The Major Force Programs that comprise the FYDP have changed little since the inception of PPBS in the early 1960s, despite changes in the operational environment and the emergence of strategic objectives such as the GIG. Some observers have recommended that the major program areas be substantially reconfigured to focus service programs on transformation initiatives, including creating a Major Force Program dedicated to C4ISR programs.³⁴ In prior work, GAO also found that the FYDP did not provide visibility over some high-priority items, including information technology.³⁵ Information technology investments as an area of funding are difficult to identify in the DOD budget, and the Office of the Secretary of Defense reports separately to Congress and OMB on DOD's information technology expenditures. However, we have found material inconsistencies, inaccuracies, or omissions that limit the reliability of this reporting effort.³⁶

In an effort to streamline the process and make it more efficient, DOD revised PPBS in 2001 to make department-level reviews of service and defense agency programs and budgets concurrent rather than sequential. In 2003 DOD further revised the process to increase its effectiveness and emphasize budget execution by requiring a full budget development cycle every other year rather than every year. DOD named the revised process the Planning, Programming, Budgeting and Execution process. These recent changes have not addressed some of the characteristics of the process that in the past made it difficult to address joint needs—such as systems interoperability:

- The services and defense agencies continue to have control over resources for command, control, and communications systems critical to the GIG, a condition that has in the past fostered development of service-specific systems with limited interoperability. As a DOD-wide interoperability solution, however, the GIG represents a different type of development challenge that requires a more cooperative, joint investment approach than has been typical of DOD in the past. If those who are responsible and accountable for the success of the GIG do not

³⁴ Stuart E. Johnson, "A New PPBS Process to Advance Transformation," *Defense Horizons*, No. 32 (Sept. 2003). *Defense Horizons* is a publication of the National Defense University's Center for Technology and National Security Policy.

³⁵ GAO, *Future Years Defense Program: Actions Needed to Improve Transparency of DOD's Projected Resource Needs*, GAO-04-514 (Washington, D.C.: May 2004), 2.

³⁶ GAO, *Information Technology: Improvements Needed in the Reliability of Defense Budget Submissions*, GAO-04-115 (Washington, D.C.: December 2003), 2.

have control over resources, the department may continue to employ a stovepiped approach to investing in systems, and thus fail to fundamentally improve interoperability outcomes.

- PPBE is still not sufficiently integrated with the requirements and acquisition processes. In addition, the requirements determination process is now structured in terms of capabilities, but the resource allocation process continues to be structured in terms of individual service and defense agency programs rather than capability areas (such as net-centricity). Also, the Major Force Programs established with the FYDP remain virtually unchanged and no longer adequately reflect the needs of current and future missions.
- The PPBE process is still not flexible enough to quickly accommodate emerging technologies or requirements resulting from lessons learned. In recent years, some budgetary flexibility has been created through such mechanisms as the congressionally established Limited Acquisition Authority³⁷ granted to U.S. Joint Forces Command to meet urgent, unanticipated warfighting needs. However, because there are no funds budgeted for this authority, the command has faced challenges in finding funding for projects.

In response to GAO recommendations, DOD has issued a policy and taken initial steps toward implementing a portfolio-based management approach to investing in information technology systems. However, DOD was slow to formalize its policy, and it is too early to assess its effectiveness.³⁸ DOD believes that managing its information technology investments by mission-oriented portfolios³⁹—a concept emphasized in the commercial sector—will (1) ensure information technology investments support the department's vision, mission, and goals; (2) ensure efficient and effective delivery of capabilities to the warfighter; and (3) maximize the return on DOD's investment. However, the DOD directive establishing information

³⁷ P.L. 108-136, National Defense Authorization Act for Fiscal Year 2004 (Nov. 24, 2003). The Limited Acquisition Authority is intended to allow U.S. Joint Forces Command (JFCOM) to provide battle management, command and control, communications, and intelligence equipment, and any other equipment the JFCOM commander determines is necessary and appropriate to facilitate the use of joint forces in military operations or enhance the interoperability of equipment used by joint forces.

³⁸ DOD Directive 8115.01, Information Technology Portfolio Management (Oct. 10, 2005).

³⁹ DOD's mission-oriented portfolios are Warfighting, Business, DOD portion of Intelligence, and Enterprise Information Environment.

technology portfolio management indicates that portfolio management processes must work within the bounds of DOD's three major investment decision-making processes. Given this guidance and the limitations of the PPBE process, it is unclear whether portfolio managers would be sufficiently empowered to meaningfully influence DOD components' information technology investments.

Acquisition Process Not Suited to Managing Interdependent Programs

DOD has taken various steps in recent years to improve acquisition outcomes and focus acquisition decision-making on developing joint, net-centric systems, but the Defense Acquisition System remains essentially structured to support investments in service-oriented systems. To effectively develop the GIG and enable net-centric capabilities, the acquisition process must ensure that programs critical to the GIG not only achieve desired cost, schedule, and performance objectives, but—because the programs are interdependent and must work together to deliver a capability—it must also ensure that their development is closely synchronized and managed. In addition, to be interoperable, systems must be developed from a joint perspective and aligned with the architecture, standards, and data strategies established for the GIG. Further, the acquisition process must be adaptive to keep pace with the rapid advances that have taken place with information technology in recent years.

Although DOD produces the best weapons in the world, GAO has found that the department's acquisition process has long been beset by problems that cause weapon systems to cost more, take longer to develop and field, and deliver less capability than originally envisioned.⁴⁰ In recent years, we recommended that DOD adopt a knowledge-based approach to acquisitions that reduces risk by attaining high levels of knowledge in three elements of a new product—technology, design, and production—at key consecutive junctures in development.⁴¹

DOD has taken steps in recent years to address these issues. In May 2003, DOD issued a revised acquisition policy that incorporated knowledge-based and evolutionary acquisition principles employed by leading commercial companies, with the aim of fostering greater efficiency and flexibility and reducing risk in the development and acquisition of weapon

⁴⁰ GAO, *High Risk Series: An Update*, GAO-05-207 (Washington, D.C.: January 2005).

⁴¹ GAO, *Defense Acquisitions: Assessments of Major Weapon Programs*, GAO-04-248 (Washington, D.C.: March 2004).

systems.⁴² The revised policy requires program managers to reduce risk by demonstrating attainment of essential knowledge at key program junctures and establishes as DOD's preferred strategy developing systems incrementally, an approach in which the customer may not get the ultimate capability right away, but the product is available sooner and at a lower cost. However, we continue to see many programs move forward with a high degree of risk. For example, programs that are critical to the GIG, such as the Joint Tactical Radio System (JTRS) and Transformational Satellite Communications System (TSAT), have progressed without sufficient knowledge that their technologies could work as intended.⁴³ Consequently, these programs have faced cost, schedule, and performance issues that have complicated DOD's efforts to deliver these key GIG components as originally planned.⁴⁴

Under the Defense Acquisition System, programs that are intended to produce interdependent systems are too often managed independently rather than as a system of systems.⁴⁵ With increased efforts to promote net-centric capabilities, key transformational systems under development depend on capabilities being provided by other acquisition programs. However, DOD program management and acquisition oversight tend to focus on individual programs and not necessarily on synchronizing multiple programs to deliver interdependent systems at the same time, as required to achieve the intended capability. This focus has affected some recent DOD efforts to develop such systems of systems. We recently reported, for example, that the Army's effort to develop a high-capacity communications network for higher-level command units, a program called the Warfighter Information Network-Tactical (WIN-T), was at risk because critical capabilities to be provided by other programs—unmanned aerial vehicles—may not be available when needed (one platform was not

⁴² DOD Directive 5000.1, The Defense Acquisition System (May 12, 2003) describes the management principles for DOD's acquisition programs. DOD Instruction 5000.2, Operation of the Defense Acquisition System (May 12, 2003), outlines a framework for managing acquisition programs. Collectively, these are known as the 5000 series.

⁴³ The JTRS and TSAT programs are or have recently been restructured and may be on a path toward a more evolutionary acquisition approach.

⁴⁴ GAO, *Defense Acquisitions: Resolving Development Risks in the Army's Networked Communications Capabilities Is Key to Fielding Future Force*, GAO-05-669 (Washington, D.C.: June 2005), 3; GAO-04-248, 27.

⁴⁵ DOD defines a system of systems as a set or arrangement of interdependent systems that are related or connected to provide a given capability. The loss of any part of the system will significantly degrade the performance or capabilities of the whole.

adequately funded for a dedicated communications capability and the other was still in the concept development phase).⁴⁶ In addition, the Army's Future Combat Systems⁴⁷ program is at risk because its development schedule is not consistent with the fielding schedules for the Joint Tactical Radio Systems, on which it is critically dependent.

Although DOD has acknowledged the growing importance of interoperability and recognizes the corresponding need to improve joint coordination in acquisitions, the military services continue to develop and acquire systems that have limited interoperability with other systems on the battlefield. This condition persists in part because the military services have traditionally focused on developing and acquiring systems to meet their own specific missions and have placed relatively less emphasis on developing and acquiring the types of interoperable systems needed to meet the demands of joint operations.⁴⁸ Consequently, systems have often been developed to perform service-specific tasks and to support vertical exchanges of information. Rather than being developed around integrated architectures⁴⁹ and common standards, systems have been designed and developed using different standards and protocols, and operate in different portions of the radio-frequency spectrum.

DOD has had policies in place for several years to improve systems interoperability, including the designation of interoperability as a key performance parameter for all systems that exchange information and required testing for interoperability, but recent military operations have shown that interoperability problems persist. Recently, DOD has introduced new initiatives to improve interoperability and focus on the need for joint, net-centric systems. For example, in 2003, DOD replaced the requirement for an interoperability key performance parameter with a

⁴⁶ GAO-05-669, 28.

⁴⁷ The Future Combat System is a large and complex effort to develop a suite of new manned and unmanned ground and air vehicles, sensors, and munitions linked by a new information network.

⁴⁸ GAO, *Military Operations: Recent Campaigns Benefited from Improved Communications and Technology, but Barriers to Continued Progress Remain*, GAO-04-547 (Washington, D.C.: June 2004), 21-22.

⁴⁹ An architecture is the structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. An integrated architecture consists of multiple views or perspectives (operational view, systems view, and technical standards view) that facilitates integration and promotes interoperability across capabilities and among related integrated architectures.

net-ready key performance parameter. Whereas the interoperability key performance parameter sought to ensure a system could exchange information directly with several other systems, the new net-ready key performance parameter requires a system to be able to exchange information with the “network.” In addition, DOD’s Chief Information Officer launched a net-centric program review effort in 2004, intended to improve the department’s focus on developing systems with net-centric attributes. While these efforts represent some commitment by DOD to improving the interoperability of the systems it develops and acquires, they may be of limited value unless interdependent programs are managed more effectively.

One mechanism DOD has used for a relatively longer period of time to help address the systems interoperability problem is combining similar service requirements into joint-service development programs in an effort to ensure closer up-front coordination between services and to realize economic efficiencies. However, in practice the department has long struggled to achieve service buy-in, which is essential to joint acquisition success. For example, in 2003 we reported that the Joint Tactical Radio System program had difficulty getting the military services to agree on joint requirements and funding necessary to execute the program. We further found that the lack of joint-service cooperation on the program hampered production of necessary program documents such as the concept of operations and migration plans and that together these factors caused schedule delays. In the meantime, the Army made unplanned purchases of additional legacy radios to meet operational needs.⁵⁰ We recommended that DOD strengthen the joint-program management structure by establishing centralized program funding, realigning the Joint Program Office under a different organizational arrangement, and placing the cluster development programs under the Joint Program Office. In the fiscal year 2004 National Defense Authorization Act,⁵¹ Congress directed DOD to take steps consistent with most of our recommendations. Similarly, DOD’s efforts to develop a Single Integrated Air Picture capability—whereby airborne tracking information from different sensor systems can be fused into a single picture—have also encountered joint management challenges. Although Joint Forces Command was given new oversight responsibilities in 2003 to promote stronger joint management of the Single Integrated Air Picture development effort, it has been difficult,

⁵⁰ GAO-03-879R.

⁵¹ P.L. 108-136 sec. 213 (Nov. 24, 2003).

according to officials from Joint Forces Command and the Single Integrated Air Picture program office, to resolve differences with the services regarding requirements and funding.

While DOD's acquisition policy now includes knowledge-based and evolutionary acquisition principles, the acquisition system operates too slowly and is too inflexible to keep pace with the rapid development of communications technologies essential to modern, interoperable command, control, and communications systems. For example, the National Research Council found in 1999 that the program management and oversight processes of the acquisition system operate on metrics optimized for weapon system acquisitions in which underlying technologies change more slowly than do the information technologies essential to modern command, control, and communications systems.⁵² The study concludes that metrics oriented to long acquisition cycles and full performance capability often do not allow for the timely integration of commercial technologies into command, control, and communications systems. More recently, in a 2002 study, DOD's Joint C4ISR Decision Support Center concluded that technology for joint command and control capabilities progresses by a generation or more before the acquisition system can field them.⁵³ The end result of these problems is that the acquisition system is not sufficiently responsive to warfighter needs for interoperable systems. DOD entities have developed short-term interoperability solutions (e.g., a communications network—the Joint Network Transport Capability⁵⁴—deployed to Iraq in 2004) and invested supplemental appropriations in legacy (largely commercial off-the-shelf) command, control, and communications systems urgently needed on the battlefield (e.g., in fiscal year 2005, Congress appropriated \$767 million in supplemental funds⁵⁵ for the legacy SINCGARS⁵⁶ radios).

⁵² *Realizing the Potential of C4I: Fundamental Challenges*, 20 and 221.

⁵³ *Joint Requirements Acquisition Study* (July 15, 2002), 14.

⁵⁴ GAO-05-669, 29.

⁵⁵ See House Report 109-72 (May 3, 2005), 110.

⁵⁶ Single Channel Ground and Airborne Radio System.

Conclusion

DOD's current approach to developing the GIG does not foster the level of coordination and cooperation needed to make the GIG a reality. DOD's management approach for the GIG effort and the department's decision-making processes contain fundamental structural impediments to success that recent changes to them have not been able to overcome. In fact, these vertically-oriented or "stovepiped" ways of doing business have helped perpetuate the very interoperability problem that the GIG is intended to overcome. We believe DOD will not be successful in "horizontal" or crosscutting initiatives such as the GIG unless it substantially changes its decentralized management approach and the service-centric, poorly integrated processes it uses to make investment decisions. The stakes are high. Management inefficiencies that were accepted as the cost of doing business in the past could jeopardize crosscutting efforts like the GIG because greater interdependencies among systems will mean that problems in individual development programs will ripple through to other programs, having a damaging effect on the overall effort. In addition, the likelihood of slowed growth and perhaps even reductions in DOD's future budgets that may result from the nation's long-term fiscal imbalance will limit the department's ability to mitigate the impact of these problems with additional budgetary resources. Without significant change in DOD's management approach and processes, we believe the department will not be able to achieve the GIG as envisioned and may have to settle for a different, more expensive solution farther out in the future than planned.

Recommendations for Executive Action

To better accommodate the crosscutting nature of the GIG development effort, we recommend DOD adopt a management approach that will ensure a joint perspective is taken. In doing so, DOD should (1) consolidate responsibility, authority, and control over resources—within the existing management structure or in a new entity—necessary to enforce investment decisions that cut across organizational lines and (2) hold the organization accountable for ensuring the objectives of the GIG are achieved.

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD concurred with our findings and recommendation (DOD's letter is reprinted in app. II). In commenting on our recommendation, however, DOD noted that Department of Defense Directive 5144.1 (May 2, 2005) indicates that the DOD Chief Information Officer is responsible for integrating information and related activities and services across the department. While this directive is intended to help strengthen the department's management of investments such as the GIG, we remain concerned that the responsibility,

authority, and accountability for developing the components of the GIG reside among many organizational entities across the department. DOD also noted in its comments that Department of Defense Directive 8115.01 (October 10, 2005) establishes policy for managing information technology by portfolios and that this portfolio approach should provide a critical tool for improving integration across the department's major decision support systems (JCIDS, PPBE, and the Defense Acquisition System). We agree that the concept of portfolio management holds promise; however, we are not confident that DOD will be able to effectively implement the policy unless it substantially changes its decision-making processes and ensures that portfolio managers are sufficiently empowered to influence DOD components' information technology investment decisions.

We are sending copies of this report to the Secretary of Defense; the Secretaries of the Air Force, Army, and Navy; the Assistant Secretary of Defense for Networks and Information Integration; the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Under Secretary of Defense (Comptroller); the Director of the Defense Information Systems Agency; and interested congressional committees. We will provide copies to others on request. This report will also be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you have any questions about this report or need additional information, please call me at (202) 512-4841 (sullivanm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix V.

A handwritten signature in black ink, appearing to read "Michael J. Sullivan".

Michael J. Sullivan
Director
Acquisition and Sourcing Management

Appendix I: Scope and Methodology

To assess the Department of Defense's (DOD) management approach for the Global Information Grid (GIG) and the extent to which the department's primary decision-making processes support the GIG, we collected and reviewed (1) related legislation, directives, instructions, and guidance; (2) DOD policies and guidance related to the GIG and network-centric (or "net-centric") governance; and (3) programmatic and technical documents pertaining to core GIG systems. We also conducted a review of relevant literature, analyzing studies on net-centric warfare, systems interoperability, and DOD management and investment decision making. We conducted this literature review by searching several types of databases using such search terms as Joint Capabilities Integration and Development System; Planning, Programming, Budgeting, and Execution process; Defense Acquisition System; interoperability; jointness; requirements; defense budget; Global Information Grid; etc. The databases were:

- the Defense Technical Information Center (DTIC) database, which collects thousands of research and development project summaries from defense organizations;
- Policy File, which provides abstracts and full-text articles on public policy research and analysis from research organizations, think tanks, university research programs, and publishers; and
- Dialog Defense Newsletters, which contains full-text newsletters on defense companies, products, markets, technologies, and legislation.

We identified related analyses by searching online archives at GAO, individual think tanks such as RAND, and congressional agencies. We also individually searched online collections of various DOD organizations, including the Defense Science Board, the Office of Force Transformation, the Quadrennial Defense Review, and the Joint C4ISR Decision Support Center. We examined the selected documents to identify the positions taken within them regarding the nature and causes of problems related to interoperability, jointness, and DOD's decision-making processes. We placed these results in a series of matrices to identify commonalities in the literature—such as concerns about organizational structure and the lack of integration among the three decision-making processes—and we used this synthesis to develop and support our findings.

In addition, we conducted interviews with and received briefings from officials with a number of DOD organizations (including the Office of the Secretary of Defense; the Joint Staff; and the three military services—the Departments of the Air Force, the Army, and the Navy) that have responsibility for achieving the GIG. We also interviewed several subject

matter experts (from academic, think tank, or consulting organizations) who have senior-level DOD experience or who have recently written on the operation of DOD and its key decision-making processes.

We conducted our work from December 2004 through January 2006 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the Department of Defense



CHIEF INFORMATION OFFICER

DEPARTMENT OF DEFENSE
6000 DEFENSE PENTAGON
WASHINGTON, DC 20301-6000

January 11, 2006

Mr. Michael J. Sullivan
Director, Acquisition and Sourcing Management
US General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Sullivan,

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report "Defense Acquisitions, DoD Management Approach and Processes Not Well-Suited to Support Development of Global Information Grid," dated December 19, 2005 (GAO Code 120383/GAO-06-211).

The DoD has reviewed the findings of the report and appreciates the efforts of the GAO staff to present objective viewpoints regarding Management Approach and Processes of the Global Information Grid. After reviewing the draft report, DoD concurs with the findings and recommendations and provides the enclosed comments.

My point of contact is Mrs. Bonnie Hammersley, Resource Planning and Budget Office. She can be reached at 703-695-3937, or via e-mail at [bonnie.hammersley@osd.mil](mailto:bонnie.hammersley@osd.mil).

A handwritten signature in black ink, appearing to read "Cheryl J. Roby".

Cheryl J. Roby
Deputy Assistant Secretary of Defense
(Resources)

Enclosure:
As Stated



**Appendix II: Comments from the Department
of Defense**

GAO DRAFT REPORT DATED JANUARY 2006
GAO-06-211

“Defense Acquisitions: DoD Management Approach and Processes Not Well-Suited to
Support Development of Global Information Grid “

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION

RECOMMENDATION: To better accommodate the crosscutting nature of the Global Information Grid (GIG) development effort, the GAO recommended that the Secretary of Defense adopt a management approach that will ensure a joint perspective is taken. In doing so, DoD should (1) consolidate responsibility, authority, and control over resources-within the existing management structure or in a new entity-necessary to enforce investment decisions that cut across organizational lines and (2) hold the organization accountable for ensuring the objectives of the GIG are achieved.

DOD RESPONSE: DoD concurs with the recommendation. DoD agrees that a management approach and specific measures are necessary to better assess and enforce GIG investment decisions that cut across organizational lines. Departmental Directive 5144.1, dated May 2, 2005, indicates that the ASD(NII)/DoD CIO is responsible for integrating information and related activities and services across the DoD. It specifically states that the ASD(NII)/DoD CIO is the principal staff assistant and advisor to the Secretary of Defense on networks and network-centric policies and concepts; command and control (C2) communications; non-intelligence space matters; enterprise-wide integration of DoD information matters; Information Technology IT, including National Security Systems and (NSS) information resources management (IRM); spectrum management; network operations; information systems, information assurance, position, navigation, and timing policy, including airspace and military-air-traffic control activities; sensitive information integration; contingency support and migration planning and related matters.

Under the leadership of the DoD CIO, DoD has established policy for management of information technology by portfolios at the enterprise level and below. DoD Directive 8115.01, IT Portfolio Management, dated October 10, 2005, establishes four IT portfolios: Business, Warfighting, DoD Intelligence, and the Enterprise Information Environment. The core GIG network and information capability cited in Appendix III of the draft GAO report (TSAT, GIG-BE, JTRS, NCES and Cryptography Transformation (part of Information Assurance) are acquisition programs for which ASD NII/CIO is the principal staff assistant. DoD Directive 8115.01 requires that DoD perform cross-cutting management of IT investments, including National Security Systems, to include integration with JCIDS, PPBE, and Defense Acquisition cited in the draft GAO report. This portfolio management approach provides a critical tool with which DoD can improve integration across these decision systems.

Appendix III: Five Major Acquisitions Related to the Core GIG Network and Information Capability

Program or initiative	Purpose	Manager
Transformational Satellite (TSAT)	To develop satellites to serve as the cornerstone of a new DOD communications infrastructure and provide high bandwidth connectivity to the warfighter. Some of the technologies that TSAT plans to use are laser cross-links, space-based data processing and Internet routing systems, and highly agile multibeam/phased array antennas.	Air Force
Joint Tactical Radio System (JTRS)	To develop family of software-defined radios to interoperate with different types of existing radios and significantly increase voice, data, and video communications capabilities.	Joint service program responsible for the software communications architecture and waveforms; military service-led programs responsible for developing radios
Global Information Grid-Bandwidth Expansion (GIG-BE)	To provide additional bandwidth and information access at key military installations within the United States and overseas via a combination of acquiring bandwidth from commercial providers as well as extending fiber optic networks to bases and installations that are located away from commercial networks.	Defense Information Systems Agency
Network Centric Enterprise Services (NCES)	To enable network users to identify, access, send, store, and protect information. Also to enable DOD to monitor and manage network performance and problems. Is expected to require development of new capabilities and tools for tagging data so it is useful, providing users with capability to identify relevant information based on content and allowing users to freely exchange and collaborate on information.	Defense Information Systems Agency
Cryptography Transformation Initiative	To enable DOD to protect the network and sensitive information. To provide information assurance and encryption support, including cryptography equipment (e.g., Internet protocol encryptors), firewalls, intrusion detection systems, etc.	National Security Agency, Defense Information Systems Agency, and the military services

Source: DOD (data); GAO (analysis and presentation).

Appendix IV: Joint Family of Concepts

In descending order, the joint family of concepts consists of the following:

Capstone Concept for Joint Operations	The overarching concept of the joint family of concepts. It broadly describes how the joint force is expected to operate in the mid- to far-term, reflects enduring national interests derived from strategic guidance, and identifies the key characteristics of the future joint force.
Joint Operating Concepts (JOC)	Describe how a Joint Force Commander will accomplish a strategic mission through the conduct of operational-level military operations within a campaign.
Joint Functional Concepts (JFC)	Describe how the future joint force will perform a particular military function across the full range of military operations.
Joint Integrating Concepts	Distill JOC- and JFC-derived capabilities into the fundamental tasks, conditions, and standards of how a joint force commander will integrate capabilities to generate effects and achieve an objective in 10 to 20 years.

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact

Michael J. Sullivan, (937) 258-7915

Acknowledgments

In addition to the contact named above, staff making key contributions to this report were John Oppenheim, Assistant Director; Marie Ahearn; Lily Chin; Joel Christenson; Lauren M. Jones; Ron Schwenn; Jay Tallon; Hai Tran; and Susan Woodward.

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